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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/828,495	04/20/2004	Julian Partridge	254-094-CIP-4/CIP-MB	4392

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EXAMINER	
TRAN, THANH Y	
ART UNIT	PAPER NUMBER
2822	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Supplemental **Office Action Summary**	Application No. 10/828,495	Applicant(s) PARTRIDGE ET AL.	
	Examiner Thanh Y. Tran	Art Unit 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant's argument, see Appeal Brief, filed 11/07/2006, with respect to the rejection of claims 1-27 under final rejection have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon the further consideration, the new ground of rejection is made in view of Shim et al (U.S 6,683,377), Komota (U.S. 2003/0016710), and Chiang (U.S. 6,803,651) as follows

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-4, 9-12, 16-18, 21-23, and 26-27 are rejected under 35 U.S.C. 102(e) as being anticipated by Shim et al (U.S 6,683,377).

As to claim 1, Shim et al discloses in figures 6A-6B a high-density circuit module comprising: a first CSP (chip 21); a second CSP (chip 20) disposed above the first CSP (21) in stacked disposition; a first form standard (first metal layer" 61) disposed, in substantial part, above the first CSP (chip 21); flex circuitry ("second metal layer" 62) connecting the first and second CSPs (21 and 20) and positioned to be, in part, beneath the first CSP (21) and, in part, above the first form standard (61) and beneath the second CSP (20), the flex circuitry (62) comprising a first side and a second side and a covercoat (23) on each of the first and second

sides of 62; at least one metallic bond ("bond wire" 22) attaching the flex circuitry (62) and the first form standard (61) (through chip 20/21).

As to claim 2, Shim et al discloses in figures 6A-6B a high-density circuit module further comprising: a second form standard disposed (a second form standard is a second metal layer of 61), in substantial part, above the second CSP (chip 20).

As to claims 3, 12 and 23, Shim et al discloses in figures 6A-6B a high-density circuit module wherein the flex circuitry is comprised of a first flex circuit (a first flex circuit is a first layer of 62) and a second flex circuit (a second flex circuit is a second layer of 62) which are each attached to the first form standard (61) with at least one metallic bond ("bond wires" 22).

As to claims 4 and 16, Shim et al discloses in figures 6A-6B a high-density circuit module further comprising: a second form standard (a second form standard is a second metal layer of 61) and in which the flex circuitry (62) is comprised of a first flex circuit (a first flex circuit is a first layer of 62), and a second flex circuit (a second flex circuit is a second layer of 62) which are each attached to the first form standard (61) with at least one metallic bond ("bond wires" 22).

As to claim 9, Shim et al discloses in figures 6A-6B a high-density circuit module comprising: a first CSP (chip 21); a second CSP (chip 20) stacked above the first CSP (21); a first form standard ("first metal layer" 61) associated with the first CSP (chip 21); and a second form standard (a second form standard is a second metal layer 61) associated with the second CSP (chip 20); and flex circuitry ("second metal layer" 62) comprising a first side and a second side and a covercoat (23) on each of the first and second sides of 62.

As to claim 10, Shim et al discloses in figures 6A-6B a high-density circuit module

comprising: flex circuitry (62) connecting the first and second CSPs (chips 21 and 20).

As to claim 11, Shim et al discloses in figures 6A-6B a high-density circuit module wherein the flex circuitry (62) is comprised of first and second flex circuits (first and second flex circuits are first and second metal layers 62)

As to claim 17, Shim et al discloses in figures 6A-6B a high-density circuit module the flex circuit (62) is attached to the first form standard (61) with adhesive (23).

As to claim18, Shim et al discloses in figures 6A-6B a high-density circuit module and a corresponding method comprising: providing a form standard ("first metal layer" 61); providing first and second CSPs (21 and 20); attaching the form standard (61) to the first CSP (21); applying a first metallic material (solder ball 25) to at least one part of the first form standard (61); providing flex circuitry ("second metal layer" 62) comprising a first side and a second side and a covercoat (23) on each of the first and second sides of 62 with an area; disposing the flex circuitry (62) adjacent to the first form standard (61) to create an area of contact; and selectively applying heat to the area of contact (it is capable of applying heat to the area between solder ball 25 and metal layer 61, see figures 6A-6B).

As to claim 21, Shim et al discloses in figures 6A-6B a stacked circuit module comprising: a CSP (chip 21); a form standard ("first metal layer" 61) attached to the CSP (21); and flex circuitry ("second metal layer" 62) attached to the form standard (61) (62 is attached to 61 through chip 21 and wiring 22) and comprising a first side and a second side and a covercoat (23) on each of the first and second sides of 62.

As to claim 22, Shim et al discloses in figures 6A-6B a stacked circuit module wherein the flex circuitry (62) is comprised of first and second flex circuits (first and second flex circuits

are first and second metal layers 62).

As to claim 26, Shim et al discloses in figures 6A-6B a high-density circuit module comprising: a first CSP (chip 21); a second CSP (chip 20) disposed above the first CSP (21) in stacked disposition; a first form standard ("first metal layer" 61) disposed, in substantial part, above the first CSP (21); flex circuitry ("second metal layer" 62) connecting the first and second CSPs (21 and 20) and positioned to be, in part, beneath the first CSP (21) and, in part, above the first form standard ("first metal layer" 61) and beneath the second CSP (20), the flex circuitry comprising at least two conductive layers (at least two conductive layers are the at least two conductive layers of 62); and at least one metallic bond ("bond wires" 22) attaching the flex circuitry (62) to the first form standard (61) (through the chip).

As to claim 27, Shim et al discloses in figures 6A-6B a unit for use in a stacked circuit module comprising: a CSP (chip 21); a form standard ("first metal layer" 61) attached to the CSP (chip 21); and flex circuitry ("second metal layer" 62) attached to the form standard (61) and comprising at least two conductive layers (at least two conductive layers are the at least two layers of 62).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 5-8, 13-15, 20 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shim et al et al (U.S. 6,683,377) in view of Komota (U.S. 2003/0016710).

As to claims 5, 20 and 24, Shim et al does not disclose the metallic bond comprises at least two metals or tin and gold; the first metallic material is comprised of tin. Komota discloses a metallic bond (adhesive) comprises at least two metals (tin and gold); the first metallic material is comprised of tin (see paragraph [0058]). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the module of Shim et al by using a metallic bond (adhesive) comprises at least two metals (tin and gold) as taught by Komota for providing a reliable bond formation because known tin and gold materials have high thermal melting bond.

As to claim 6, Shim et al does not disclose a metallic bond is created by combining a first metallic material applied to the first form standard and a second metallic material from which the flex circuitry is comprised. Komota discloses a metallic bond (adhesive) comprises tin and gold materials (see paragraph [0058]). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the module of Shim et al by using a metallic bond (adhesive) comprises tin (first metallic material) and gold (second metallic material) as taught by Komota for providing a reliable bond formation because known tin and gold materials have high thermal melting bond.

Further, the limitation of "metallic bond is created *by combining a first metallic material applied to the first form standard and a second metallic material from which the flex circuitry is comprised*" is a process limitation in a product claim which does not otherwise patentably distinguish over prior art, cannot impart patentability to the product. In re Stephens 145 USPQ 656 (CCPA "thin film" 1965).

As to claims 7, 8, and 15, Shim et al does not disclose the combining of the first metallic

material and the second metallic material is achieved through a selected application of heat. Komota discloses a metallic bond (adhesive) comprises tin (first material) and gold (second material) is achieved through a selected application of heat and is achieved with localized friction heating (see paragraph [0058]) (it should be noted that: when a metallic bond (adhesive) is heated it is inherently achieved through a selected application of heat and is achieved with localized friction heating). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the module of Shim et al by using a metallic bond (adhesive) comprises tin (first metallic material) and gold (second metallic material) as taught by Komota for providing a reliable bond formation because known tin and gold materials have high thermal melting bond.

Further, the limitations of "the combining of the first metallic material and the second metallic material is achieved through a selected application of heat" in claim 7, and "the selected application of heat is achieved with localized friction heating" in claim 8, "the metallic bond *is realized by selective application of heat*" in claim 15 are process limitations in product claims which do not otherwise patentably distinguish over prior art, cannot impart patentability to the product. In re Stephens 145 USPQ 656 (CCPA "thin film" 1965).

As to claims 13 and 14, Shim et al does not disclose the metallic bond comprises a first metallic material and a second metallic material. Komota discloses a metallic bond (adhesive) comprises a first metallic material (tin) and a second metallic material (gold) (see paragraph [0058]). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the module of Shim et al by using a metallic bond (adhesive) comprises a first metallic material (tin) and a second metallic material (gold) as taught

by Komota for providing a reliable bond formation because known tin and gold materials have high thermal melting bond.

5. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shim et al et al (U.S. 6,683,377) in view of Chiang (U.S. 6,803,651).

As to claim 19, Shim et al does not teach step of using vibration to perform the step of selectively applying heat to the area of contact. Chiang teaches the method of using vibration to perform the step of selectively applying heat to the area of contact (see col. 13, lines 7-10). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the apparatus and the corresponding method of Shim et al by using vibration method for performing heat as taught by Chiang for providing a good bonding connection which is easy to be deformed by vibration (see col. 13, lines 7-10 in Chiang).

Response to Arguments

6. Applicant's arguments with respect to claims 1-27 have been considered but are moot in view of the new ground(s) of rejection.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Y. Tran whose telephone number is (571) 272-2110. The examiner can normally be reached on M-F (9-6:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith, can be reached on (571) 272-2429. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9"thin film" 197 (toll-free).

TYT

Zandra V. Smith
Supervisory Patent Examiner
5 March 2007